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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,244	04/12/2004	Jing-Horng Gau	JCLA12737	4067
23900	7590	02/13/2006	EXAMINER	
J C PATENTS, INC. 4 VENTURE, SUITE 250 IRVINE, CA 92618			MONDT, JOHANNES P	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/823,244	Applicant(s) GAU, JING-HORNG	
	Examiner Johannes P. Mondt	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/19/06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/19/06 has been entered.

Response to Amendment

Amendment filed 1/19/06 with aforementioned Request for Continued Examination forms the basis for this office action. In said Amendment applicant substantially amended all pending claims 1-9 through substantial amendment of claim 1. Comments on Remarks submitted with said Amendment are included below under "Response to Arguments".

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. ***Claims 1-9*** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claims contain subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

In particular, the limitation “the dopant concentration of the second conductive type embedded region under the second conductive type well is the same as the dopant concentration of the second conductive type embedded region beside (i.e., to the side of) the second conductive type well” newly added to claim 1 (lines 8-11) has not been disclosed in the original specification including original claims.

The specification portion relevant to the specific embodiment of Figure 2 (paragraphs [0021]-[0026]) is as devoid of said disclosure as the remainder of the specification because the mere disclosure of ion implantation steps using ions “set to an energy level suitable for landing at a particular depth” does not imply said limitation in view of (a) the absence of a teaching that the ion implantation flux is constant as a function of the lateral coordinate, and because of (b) the inherent exponential fall-off of ion implantation depth penetration profiles (see, e.g., Wolf, ISBN: 0-961672-4-5, pages 558-661)), as a result of which the implantation step for the second conductive type well 204 necessarily increases the concentration of ions implanted in the region within the second conductive type embedded region that is vertically underneath the second conductive type well over the concentration elsewhere in the second conductive type embedded region.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. ***Claims 10-17*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Russ et al (2003/0047750 A1) in view of Amerasekera (EP 0 822 596 A2).

Russ et al teach (title, abstract, Figure 2 and [0031]-[0039]) a junction diode, comprising :

a first conductive type (p-type) substrate 203;

a second conductive type (n-type) embedded region

210₁/206₂/205/208/206₂/210₂ formed within the first conductive type substrate;

a second conductive type (n-type) epitaxial well 208, formed within the second conductive type embedded region,

wherein the second conductive type well has a dopant concentration smaller than the second conductive type embedded region (see [0033]), and

the second conductive type embedded region surrounds the second conductive type well (Figure 2);

a first conductive type (p-type) doped region 212, formed in said second conductive type well; and

at least two second conductive type (n-type) regions 210₁ and 210₂, formed in the second conductive type embedded region beside the first conductive type doped region.

Russ et al do not necessarily teach an additional substrate underneath said substrate and of conductivity type opposite to said first conductive type.

However, it would have been obvious to include said additional substrate in view of Amerasekera, who, in a patent document drawn to improvements in ESD circuits, hence analogous art, teach the addition of a substrate underneath an active area so as to produce vertical bipolar structure for additional ESD protection (see Summary of the Invention, columns 1 and 2, and Figures 1a, 1b and 3).

Motivation for the adoption in the invention by Russ et al by the additional ESD protection a vertical bipolar structure provides, the invention by Russ et al not having said vertical bipolar structure: because 210, 206 and 205 are all of n-type conductivity, only a limited region vertically underneath 212 would otherwise have said vertical bipolar structure to protect against ESD. Upon interchanging conductivity type nomenclature, combination of said teaching with said invention yields the structure of claim 10, just as adding an additional substrate of a conductivity type opposite to the substrate of Figure 2 in the specification by Applicant yields the junction diode of claim 10 from the junction diode of claim 1: specifically, the junction diode comprising: a first conductive type substrate (n-type substrate following Amerasekera); a second conductive type deep well formed within said first conductive type substrate (the p-type substrate of Russ et al, element 203); a first conductive type well formed within the

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second conductive type deep well (the n-type region defined by the union of 210₁ , 206₂ , 205, 208, 206₂, and 210₂); a first conductive type shallow well formed within the first conductive type well (namely: n-type region 206₁/206₂/208/214), wherein the first conductive type shallow well has a dopant concentration smaller than the first conductive type well (see [0033]); a plurality of first conductive type doped regions formed in the first conductive type well (n-type regions 210₁, 210₂); and a plurality of second conductive type doped regions formed in the second conductive type deep well (p-type regions 212₁, 212₂) and one second conductive type doped region formed in the first conductive type shallow well (p-type region 214), wherein the second conductive type doped region formed in the first conductive type shallow well (214) is isolated from the second conductive type deep well (203) by the first conductive type well (210₁/206₂/205/208/206₂/210₂).

On claim 11-16: the specific selections of conductivity type as limited by these claims merely pertain to the selection of p-type conductivity type as the first conductivity type, and logically following, n-type conductivity as the selection of the second conductive type. Overall interchange of conductivity in the semiconductor device art is without patentable weight unless disclosed to be critical to the invention. In the underlying case, both conductivity types are actually disclosed to be equivalent by Applicant (see specification, paragraph [0012]).

On claim 17: the junction diode further comprises a plurality of isolation structures 218 (see [0035]) with each isolation structure set between every pair of first

conductive type doped region and second conductive type doped region (regions 212 and 210, respectively; see Figure 2).

Response to Arguments

Applicant's arguments filed in Remarks of said Amendment have been fully considered but they are not persuasive. In particular, no disclosure has been found in the specification that supports the amendment of claim 1 as amended in said Amendment (see above under 35 USC 112, first paragraph). The further limitation added to claim 1 as amended is not met by Russ et al because the sinkers are of relatively high conductivity type (elements 206) in comparison with the buried n-type layer 205. Upon further consideration claims 10-17 are obvious over Russ et al in view of newly found prior art in the form of Amerasekera (EP 0 822 596 A2). Regretfully the previous indication of allowability for claims 10-17 has herewith been withdrawn (see 35 USC 103(a) above).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
February 5, 2006

Patent Examiner:

A handwritten signature in black ink, appearing to read 'J. Mondt', with a stylized flourish at the end.

Johannes Mondt (Art Unit: 3663)